

CLAIMS

[1] A mixer characterized in that

a powder material and a liquid material are combined by:

5 adding the liquid material from a side of a rotational axis to the powder material spreading and revolving along an inner wall surface of an outer cylinder, the liquid material being processed to a fine particle having a size which does not need to move and combine with the new powder material after combining with the powder material; and an inertial classification operation in which:

10 the powder material combined with the liquid material is moved to a side of the inner wall of the outer cylinder, while the powder material not combined with the liquid material is moved toward a side of the rotational axis; or

the powder material having a high degree of combining with the liquid material is moved to the side of the inner wall surface of the outer cylinder, while the

15 powder material having a low degree of combining with the liquid material is moved toward the side of the rotational axis.

[2] The mixer according to claim 1, further comprising a fin which is provided around the rotational axis and is independently revolvable, wherein:

20 the fin has a bottom face extending along the inner wall surface of the outer cylinder, a low thickness, and a width which is not too wide in the direction of revolution; and

the fin itself has little function for pressing and forwarding the powder material, however, the powder material riding on the fin spreads along the inner wall surface of the 25 outer cylinder by being replaced by the powder material on the inner wall surface of the

outer cylinder.

[3] The mixer according to claim 1, further comprising a fin which is orthogonal to a direction of revolution of the powder material, and traverses the outer cylinder along the 5 inner wall surface of the outer cylinder.

[4] The mixer according to claim 1, further comprising a fin which forms a non-vertical angle with respect to a direction of revolution of the powder material, and traverses the outer cylinder along the inner wall surface of the outer cylinder.

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[5] The mixer according to claim 1, wherein
a cylinder forming the rotational axis comprises an opening through which an outside and an inside of the cylinder communicate, and discharges a liquid film made of the liquid material using a centrifugal force in order to obtain fine particles made of the 15 liquid material, and wherein
the fine particles of the liquid material are obtained by discharging the liquid film from an edge of the opening.

[6] The mixer according to claim 5, wherein:
20 a plurality of cylinders each having through holes formed on a wall surface through which the liquid material passes are combined inside the cylinder having the opening;
the number of the through holes increases when approaching the outer-most cylinder;
25 a liquid amount of the liquid material is divided among the through holes of

which the number thereof increases while the liquid material supplied from the inner-most cylinder is moved to the outer-most cylinder through the through holes by a centrifugal force accompanying by rotation of the cylinders; and

the fine particles of the liquid material are obtained by discharging the liquid film

5 from the edge of the opening of the cylinder on the outside.

[7] A mixer which combines a powder material and a liquid material, characterized in that:

the mixer comprises an outer cylinder into which the powder material is loaded, a
10 rotational axis which is located coaxially with the outer cylinder and discharges the liquid material while forming the liquid material to fine particles, and a fin which has a rectangular shape and is disposed along an inner wall of the outer cylinder;

the fin is independently revolvable around the rotational axis; and
the fin has side faces in a direction of revolution of the fin, each of which forms
15 an inclined face such that a width of the fin becomes wider from an inner surface to an outer surface of the fin.

[8] The mixer according to claim 7, wherein the fin is orthogonal to a direction of revolution of the powder material, and traverses the outer cylinder along the inner wall
20 surface of the outer cylinder.

[9] The mixer according to claim 7, wherein the fin forms a non-vertical angle with respect to a direction of revolution of the powder material, and traverses the outer cylinder along the inner wall surface of the outer cylinder.

[10] The mixer according to claim 7, wherein

a cylinder forming the rotational axis comprises an opening through which an outside and an inside of the cylinder communicate, and discharges a liquid film made of the liquid material using a centrifugal force in order to obtain fine particles made of the

5 liquid material, and wherein

the fine particles of the liquid material are obtained by discharging the liquid film from an edge of the opening.

[11] The mixer according to claim 10, wherein:

10 a plurality of cylinders each having through holes formed on a wall surface through which the liquid material passes are combined inside the cylinder having the opening;

the number of the through holes increases when approaching the outer-most cylinder;

15 a liquid amount of the liquid material is divided among the through holes of which the number thereof increases while the liquid material supplied from the inner-most cylinder is moved to the outer-most cylinder through the through holes by a centrifugal force accompanying rotation of the cylinders; and

the fine particles of the liquid material are obtained by discharging the liquid film
20 from the edge of the opening of the outer-most cylinder.

[12] A method of combining a powder material and a liquid material, characterized in that

a powder material and a liquid material are combined by:

25 adding the liquid material from a side of a rotational axis to the powder material

spreading and revolving along an inner wall surface of an outer cylinder, the liquid material being processed to a fine particle having a size which does not need to move and combine with the new powder material after combining with the powder material; and an inertial classification operation in which

- 5 the powder material combined with the liquid material is moved to a side of the inner wall of the outer cylinder, while the powder material not combined with the liquid material is moved toward a side of the rotational axis; or
- the powder material having a high degree of combining with the liquid material is moved to the side of the inner wall surface of the outer cylinder, while the
- 10 powder material having a low degree of combining with the liquid material is moved toward the side of the rotational axis.